

# UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 5884

CSAH NO. 2

OVER THE

NORTH FORK OF THE CROW RIVER

DISTRICT 8 - KANDIYOHI COUNTY

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY  
COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 89)

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 5884, the North and South Abutments and Pier 1, were in good condition with no defects of structural significance observed. The footing along the South Abutment was exposed with up to 2 feet of vertical face exposure. The channel bottom appeared stable with minor localized scour observed and with no appreciable changes since the previous inspection.

INSPECTION FINDINGS:

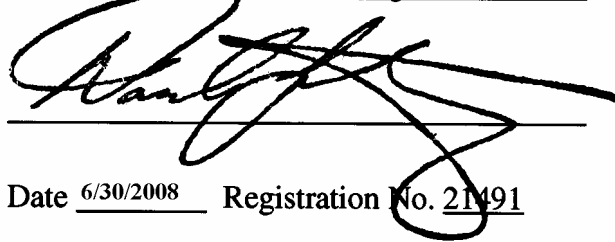
- (A) The top of the footing at the South Abutment was exposed along the entire breastwall and along half of each of the wingwalls, with up to 2 feet of vertical face exposure.
- (B) Two 1/32 to 1/16 inch wide vertical cracks, which extended from the top of the pier cap to the channel bottom, were observed on each face of the pier around the midpoint of the shaft.
- (D) A 3-foot-radius, 1.5-foot-deep scour depression was observed at the downstream end of the pier.
- (E) A 6-foot-radius, 2.5-foot-deep scour pocket was observed at the upstream corner of the South Abutment.

RECOMMENDATIONS:

- (A) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years. During future inspections, specifically monitor the footing exposures and extent of scour.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

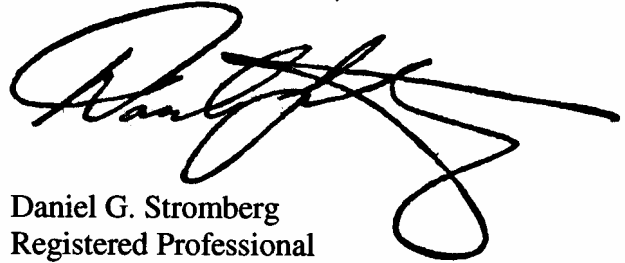
Daniel G. Stromberg

A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over a horizontal line.

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over a horizontal line.

Daniel G. Stromberg  
Registered Professional  
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 5884

Feature Crossed: North Fork of the Crow River

Feature Carried: CSAH No. 2

Location: District 8 - Kandiyohi County

Bridge Description: The bridge superstructure consists of two spans of multiple steel beams that are supported by two reinforced concrete abutments and one reinforced concrete pier. Both the abutments and the pier are founded on timber piles.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg, P.E., S.E.

Dive Team: Clayton G. Brookins, Valerie Roustan

Date: October 19, 2007

Weather Conditions: Partly Cloudy, 50 °F

Underwater Visibility: 2.0 Feet

Waterway Velocity: 1.5 fps

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: North and South Abutments, and Pier 1.

General Shape: The abutments consist of a breastwall and two skewed wingwalls. The pier consists of an oblong rectangular shaft with a pointed upstream nose and squared corners at the downstream end. All of the units sit on rectangular footings founded on piles.

Maximum Water Depth at Substructure Inspected: Approximately 6.5 Feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the west end of Pier 1.

Water Surface: The waterline was approximately 5.9 feet below reference.

Waterline Elevation = 92.9.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/10/07

Item 113: Scour Critical Bridges: Code I/02

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

       Yes   X   No

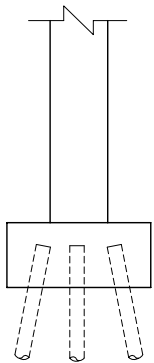
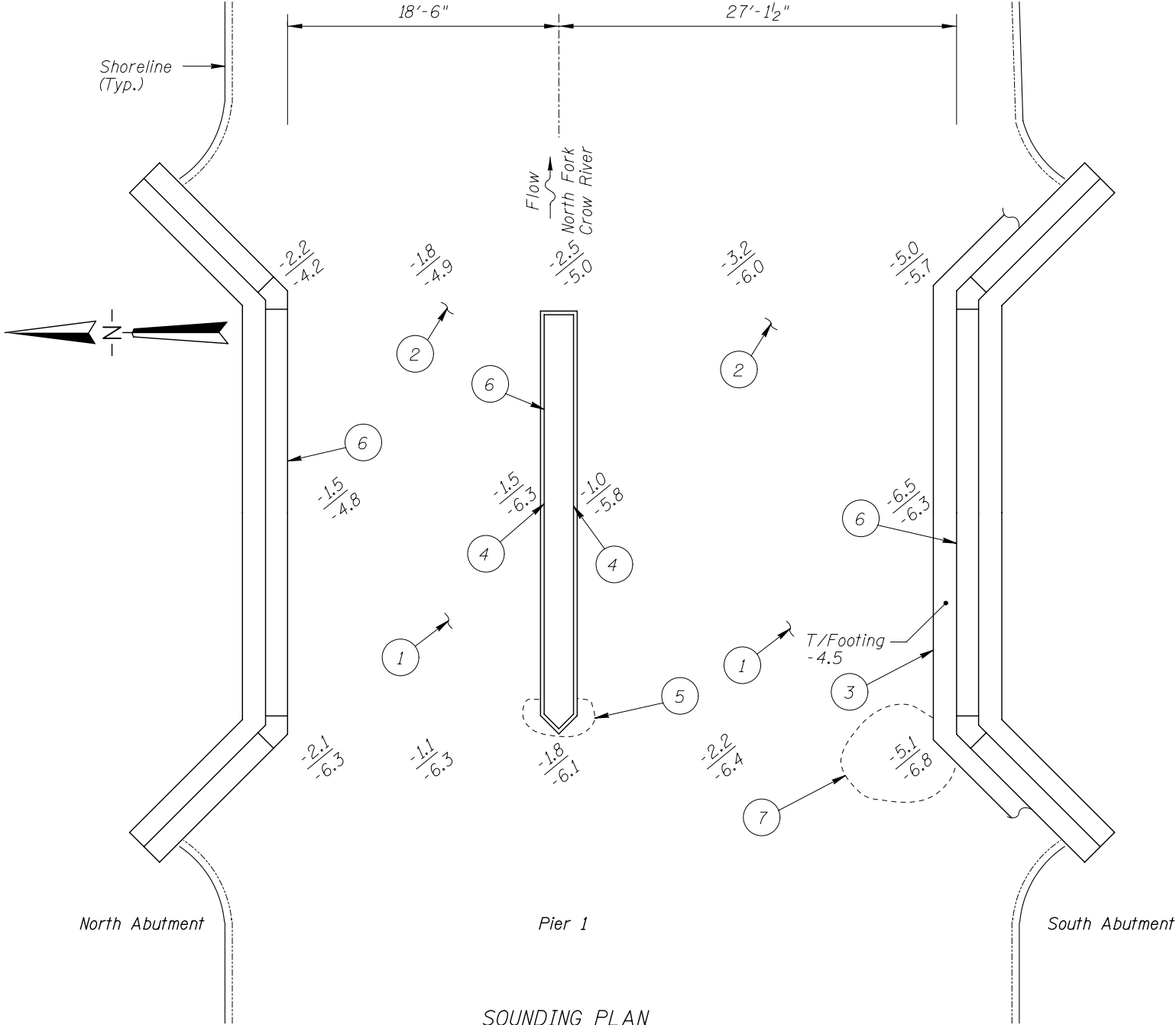


Photograph 1. View of Pier 1, Looking Northeast.



Photograph 2. View of the North Abutment, Looking Northeast.





TYPICAL END VIEW OF PIER

- GENERAL NOTES:
1. The North and South Abutments and Pier 1 were inspected underwater.
  2. At the time of inspection on October 19, 2007, the waterline was located approximately 5.9 feet below the top of the pier cap at the downstream end of Pier 1. This corresponds with a waterline elevation of 92.9.
  3. Soundings indicate the water depth at the time of inspection and are measured in feet.
  4. Soundings were taken parallel to the bridge at the mid points between the substructure units.

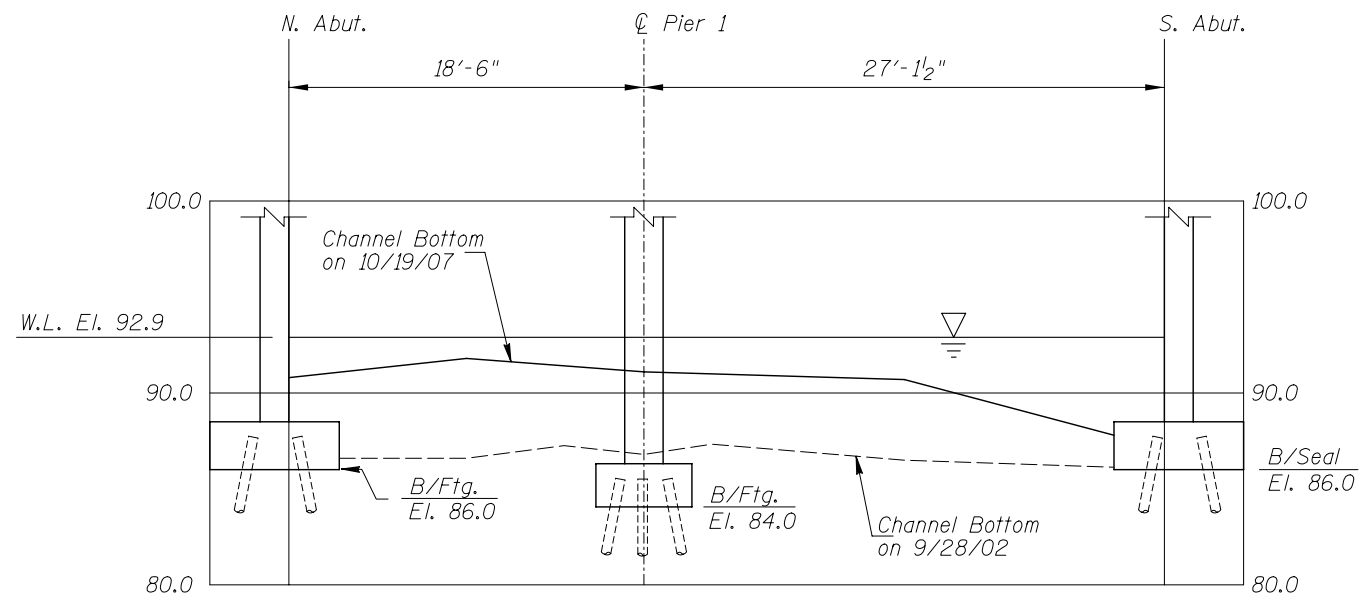
- INSPECTION NOTES:
1. The channel bottom consisted of silt with up to 1.5 feet of probe rod penetration.
  2. The channel bottom consisted of silty sand with 2- to 4-inch-diameter cobbles with 2 to 4 inches of probe rod penetration.
  3. The top of the footing was exposed along the entire breastwall and along half of each of the wingwalls, with up to 2 feet of vertical face exposure.
  4. Two vertical 1/32-1/16 inch wide cracks, which extended from the top of the pier cap to the channel bottom, were observed on both faces centered at the midpoint and 6 feet apart.
  5. A 3-foot-radius, 1.5-foot-deep scour pocket was observed at the downstream end of the pier.
  6. A band of minor scaling was observed at the waterline on all substructure units.
  7. A 6-foot-radius, 2.5-foot-deep scour pocket was observed at the upstream corner of South Abutment.

Note:

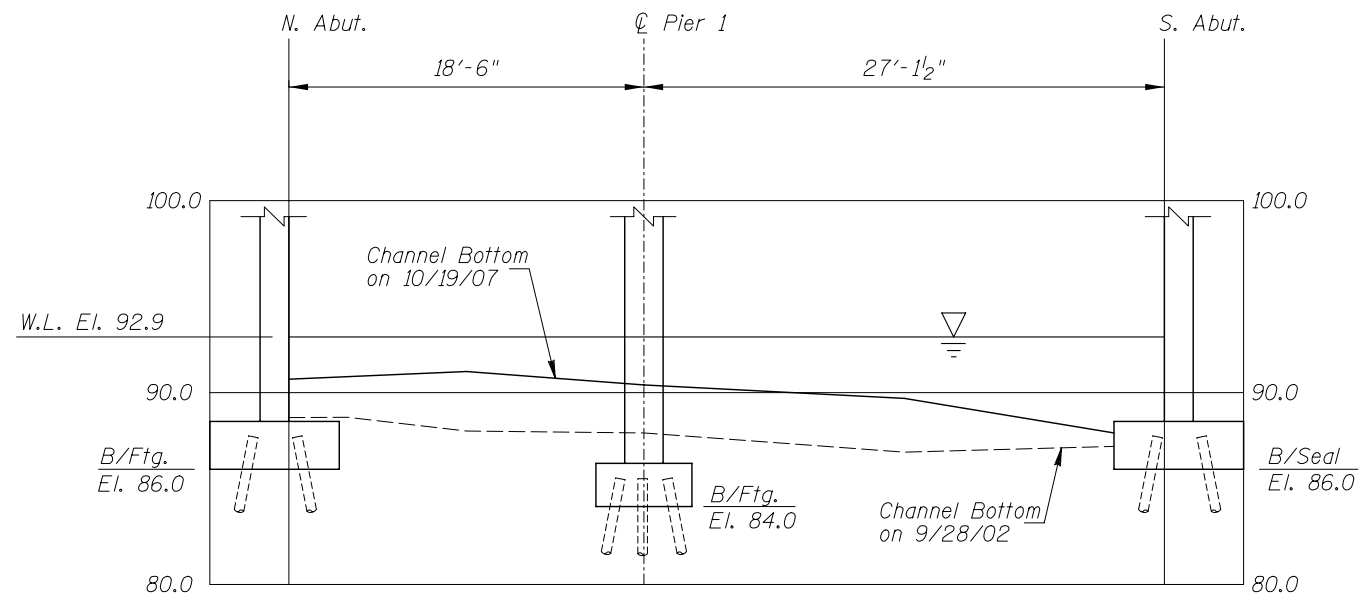
All soundings based on 2007 waterline location.

- Legend
- |      |                           |
|------|---------------------------|
| -2.0 | Sounding Depth (10/19/07) |
| -5.2 | Sounding Depth (9/28/02)  |
- Scour Depression

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 5884 OVER THE NORTH FORK OF THE CROW RIVER DISTRICT 8, KANDIYOHI COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: LJ	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: OCT. 2007
Checked By: VR		Scale: NTS
Code: 52210089		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 5884  
OVER THE NORTH FORK OF THE CROW RIVER  
DISTRICT 8, KANDIYOHI COUNTY

**UPSTREAM AND DOWNSTREAM  
FASCIA PROFILES**

Drawn By: LJ  
Checked By: VR  
Code: 52210089

**COLLINS  
ENGINEERS**  
123 North Wacker Drive  
Suite 300  
Chicago, IL 60606  
(312) 704-9300  
www.collinsengr.com

Date: OCT. 2007  
Scale: 1"=10'  
Figure No.: 2



MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES  
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 19, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 5884 WEATHER: Cloudy, 50 °F

WATERWAY CROSSED: The North Fork of the Crow River

DIVING OPERATION: ☒ SCUBA ☐ SURFACE SUPPLIED AIR  
☐ OTHER

PERSONNEL: Clayton G. Brookins, Valerie Roustan

EQUIPMENT: Scuba, Scraper, Lead Line, Camera, U/W Light, Probe Rod, Camera

TIME IN WATER: 4:40 P.M.

TIME OUT OF WATER: 5:10 P.M.

WATERWAY DATA: VELOCITY 1.5 fps

VISIBILITY 2.0 feet

DEPTH 6.5 feet maximum at South Abutment.

ELEMENTS INSPECTED: North and South Abutments, and Pier 1.

REMARKS: Overall, the concrete of the North and South Abutments and Pier 1 was in good condition with no defects of structural significance observed. The footing at the South Abutment was exposed with up to 2 feet of vertical face exposure. Two vertical 1/32 to 1/16 inch wide cracks extended from the top of the pier cap to channel bottom around the midpoint on each face of Pier 1. A 3-foot-radius, 1.5-foot-deep scour pocket was observed at the downstream end of Pier 1. A 6-foot-radius, 2.5-foot-deep scour pocket was observed at the upstream corner of the South Abutment.

FURTHER ACTION NEEDED: ☐ YES ☒ NO

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years. Specifically monitor the footing exposure and extent of scour during future inspections.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 5884  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.  
WATERWAY CROSSED North Fork of the Crow River

INSPECTION DATE October 19, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	North Abutment	2.2'	N	7	N	9	N	7	8	N	N	N	8	7	N	N	N	N	N
	Pier 1	2.5'	N	6	N	9	N	6	7	N	N	N	7	6	N	N	N	N	N
	South Abutment	2.5'	N	6	8	9	N	6	6	N	N	N	6	6	N	N	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete of the North and South Abutments and Pier 1 was in good condition with no defects of structural significance observed. The footing at the South Abutment was exposed with up to 2 feet of vertical face exposure. Two vertical 1/32 to 1/16 inch wide cracks extended from the top of the pier cap to channel bottom around the midpoint on each face of Pier 1. A 3-foot-radius, 1.5-foot-deep scour pocket was observed at the downstream end of Pier 1. A 6-foot-radius, 2.5-foot-deep scour pocket was observed at the upstream corner of the South Abutment.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.  
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.